Amendments to the Drawings:

The attached sheet of drawings includes changes to Fig. 2. In Figure 2, appropriate labels have been added to boxes 32, 34, 36 and 38.

Attachment: Replacement Sheet

REMARKS

In response to the objection to the drawings, as set forth in item 1 of page 2 of the Office Action, Applicants have submitted herewith a replacement sheet containing Figure 2, in which appropriate labels have been added to boxes 32, 34, 36 and 38, as required. Accordingly, reconsideration and withdrawal of this ground of objection are respectfully requested.

Claims 1-7 and 11-18 have been rejected under 35 U.S.C. §102(b) as anticipated by Gropp (UK patent application GB 2 222 046), while Claims 1-5 and 15 have been rejected as anticipated by Vauchy (UK patent application GB 2 107 835). In addition, Claims 6, 7, 11-14 and 16-18 have been rejected under 35 U.S.C. § 103(a) as unpatentable over Vauchy in view of Maughan et al (U.S. Patent No. 5,140,329). However, for the reasons set forth hereinafter, Applicants respectfully submit that all claims of record in this application distinguish over the cited references, whether considered separately or in combination.

The present invention relates to a targeting system of the feedback type, in which the results obtained from the firing of a first ballistic missile, such as a conventional artillery shell, is used to adjust the aiming of the launcher until a shall impacts on the target. In conventional systems of this type, the impact point of the shell is observed, and the targeting system is adjusted based on information obtained in this matter. Accordingly, the amount of time required to

achieve a direct impact on the target becomes lengthy, due to the need to wait until the shell actually impacts, to determine its landing point, so that an adjustment can be made.

The present invention addresses and resolves this problem by providing a method in which, following the launching of a missile, its trajectory is tracked, and a predicted point of impact of the missile is calculated immediately after it reaches the apogee of its trajectory. The predicted impact point is then fed back to the missile launcher before the missile impacts, so that a correction to subsequent firings may be made, based on the projected impact. It is thus unnecessary to wait what may be a significant additional period of time in order for the first shell to impact, before the second shell is launched, using information gained from the "error" in the first shell.

Claim 1 of the application defines a method of controlling the operation of a missile launcher, which includes the steps described above. In particular, Claim 1 recites a step of "calculating a predicted point of impact of the missile immediately after it reaches its trajectory apogee". In addition, Claim 1 further recites the step of feeding back the predicted point of impact to the missile launcher "before the fired missile impacts". Similarly, apparatus Claim 3 recites calculation means for calculating a predicted impact of the missile, "the calculation means being operable immediately after the missile reaches its trajectory apogee" and furthermore, feedback means for feeding back the

predicted point of impact to the missile launcher "so that a correction can be applied before the fired missile makes impact prior to the launch of the subsequent missile". The latter features of the invention are neither taught nor suggested by the cited references.

In particular, Gropp discloses a method that calculates the flight path and impact point based on measurements taken during the ascending and descending points of the flight path of the projectile. This means that the impact point cannot be calculated until after the projectile has been descending for a period of time. Thus, at page 1, line 22 through page 2, line 3, the specification states that, "two measuring points on the flight path of the projectile are measured, the first measuring point being situated in the ascending part and the second measuring point in the descending part of the flight path, after which the actual flight path and thus the actual impact point are determined from said measuring point". By way of contrast, as noted previously, both of independent Claims 1 and 3 recites specifically that the predicted point of impact is calculated immediately after the fired missile reaches its apogee. Gropp neither teaches nor suggests the proposition that an accurate calculation could be made, as is done in the present invention, based only on the ascending trajectory of the projectile, immediately after it reaches its apogee. Accordingly, Claims 1 and 3, and therefore all claims of record differ from the Gropp reference.

The Vauchy reference, on the other hand, discloses a method that uses a pulse of light from a laser range finder to illuminate a projectile from when it is fired, and uses the reflected pulse to determine the position of the projectile at least once during the flight. The method thus disclosed is applicable only to projectiles having a trajectory in which the deflection is very slight (less than 1%) relative to the distance covered. Thus, the Abstract of the Disclosure states that the invention relates only to weapons "firing a projectile having a flat trajectory". (Page 1, lines 5-6.) As explained at page 1, lines 56 *et seq.*, the return of reflected light pulses is used in order to form on a detection surface a point representative of the position of the projectile. The deviation of this point from the point representative of the obstacle axis is measured, and the result of this measurement is used to control the next shot.

It is apparent from the foregoing brief description that the Vauchy reference contains no disclosure which suggests the calculation of a predicted point of impact of a missile immediately after it reaches its trajectory apogee. Indeed, the trajectory apogee does not appear to play a role at all in the calculation of a point of impact. As noted at page 1, lines 109 *et seq.*, the distance of the projectile from the sighting axis is measured at a "selected moment" before the presumed moment of impact. The "selected moment" is chosen such that, for example, "the projectile has traveled over 95% of its theoretical trajectory...."

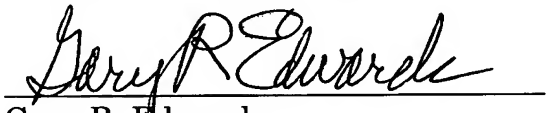
Accordingly, Applicants respectfully submit that Claims 1 and 3, and therefore all claims of record, distinguish over Vauchy et al as well.

The Maughan et al reference, on the other hand, discloses a method that maintains an atmospheric model, used to aim a weapon to hit a target, taking into account the atmospheric model. Actual trajectory data obtained by radar analysis are used to determine the atmospheric model. This is used in conjunction with initial muzzle velocity to aim at a target. In contrast with the present invention, this system maintains and uses an atmospheric model to aim projectiles, and thus differs substantially from the present invention, which provides a less complex solution by feeding a predicted point of impact into the "prior control loop" immediately after the projectile has reached the apex of its trajectory. Maughan et al contains nothing which teaches or discloses such a system.

In light of the foregoing remarks, this application should be in condition for allowance, and early passage of this case to issue is respectfully requested. If there are any questions regarding this amendment or the application in general, a telephone call to the undersigned would be appreciated since this should expedite the prosecution of the application for all concerned.

If necessary to effect a timely response, this paper should be considered as a petition for an Extension of Time sufficient to effect a timely response, and please charge any deficiency in fees or credit any overpayments to Deposit Account No. 05-1323 (Docket #101709.56096US).

Respectfully submitted,



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Attachment – Replacement Sheet
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